

Comparison of antibacterial property of chitosan nanoparticles against *Escherichia coli* and *Staphylococcus aureus*

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★Abstract

Background: With the advent of modern sciences such as nanotechnology, the hope for treatment of infectious diseases has increased. Nanochitosan is one of the most widely used nanomaterials in this field that has been considered due to its characteristics such as biocompatibility, nontoxicity and bactericidal activity.

Objective: The aim of this study was to compare the antibacterial properties of chitosan nanoparticles against *Escherichia coli* and *Staphylococcus aureus*.

Methods: This in vitro study was performed at Iranian Research Organization for Science and Technology in 2014. Chitosan nanoparticles were prepared based on the ionic gelation. The characteristics of the prepared nanoparticles were determined by DLS and SEM. The antibacterial activities of chitosan nanoparticles against *Escherichia coli* and *Staphylococcus aureus* were evaluated by determination of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). Data were analyzed using One-way ANOVA and T-test.

Findings: Chitosan nanoparticles were formed with an average size of 160 nm. The MIC and MBC of chitosan nanoparticles were 0.25 and 1 mg/ml for *Escherichia coli* and were 0.5 and 2 mg/ml for *Staphylococcus aureus*. The diameter of zones of inhibition was 19 mm for *Escherichia coli* and 14 mm for *Staphylococcus aureus* in 10 mg/ml concentration of chitosan nanoparticles.

Conclusion: With regards to the results, it seems that nanochitosan has acceptable antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*. But *Escherichia coli* is more sensitive to chitosan nanoparticles than *Staphylococcus aureus*.

Keywords: Nanotechnology, Chitosan, Anti-Bacterial Agents, *Escherichia Coli*, *Staphylococcus Aureus*

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